



# Effect of Putrescene, Indole Acetic Acid and Salicyclic Acid on Morpho-Physiological Attributes of Long Melon: A Case Study

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## General Note



Article is recommended to print as color version in recycled paper. *Save Trees, Save Nature.*

## ABSTRACT

The present project of growing of Long Melon has been done by the group at Lovely Professional University farm land plot no-58. The present report comprises of the work done by the group and the plot was divided in to several treatments based on the compatibility suggested by the scientist. This includes the package practices of Long Melon so far done. The intercultural operations, model of application of treatments and also regular time intervals of irrigation. To determine the effect of putrescine, iaa, salicyclic

acid on physio-morphological attributes of long melon. The series of observation noted and so far done and economic analysis will give the complete detailed over view of the project.

**Keywords:** Agriculture, Biotic, Cadmium, Diffusion, Efficiency, Forage, Gap, High

## 1. INTRODUCTION

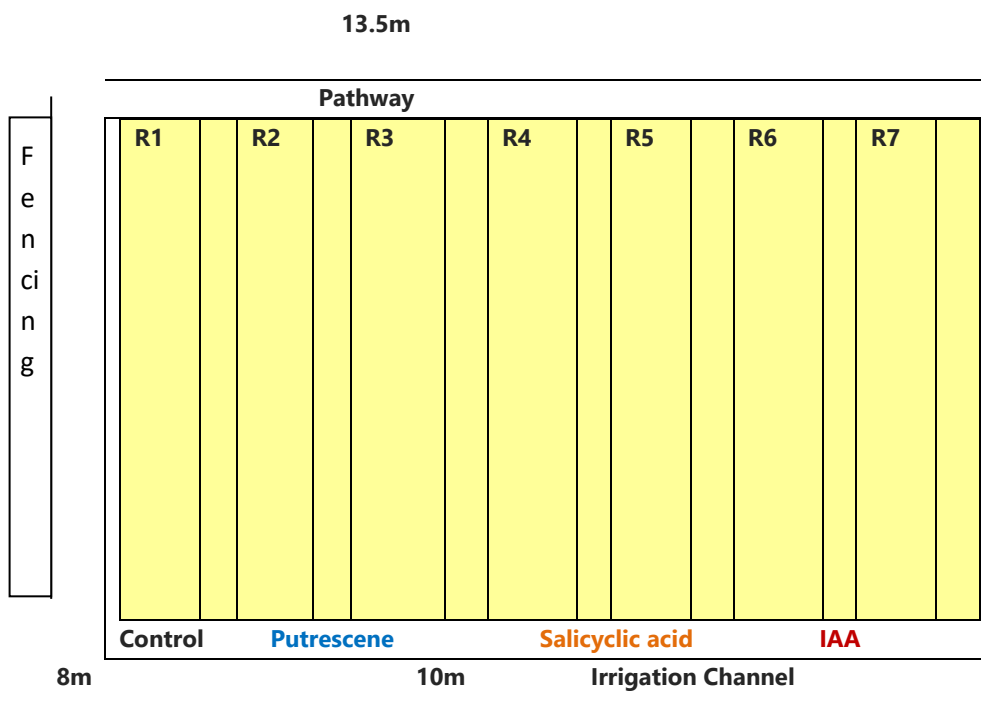
Long Melon (*Cucumis melo* var. *Utilissimus*) is one of the foremost critical vegetable crop. The cucurbits frame a particular bunch of species with numerous likenesses in botany, agronomy biological necessities and defencelessness to creepy crawly bothers and diseases. Long melon is additionally one of them (Arora et al., 1985, Bourbouloun et al., 1998, El-kholy and Hafez, 1982). A few of them are utilized within the form of serving of mixed greens, cooked as vegetables, and protected within the frame of desserts. It is developed basically developed in tropical, subtropical and milder zones of India. Long melon prevalently known as kakri is values for delicate fruits which are eaten crude at the side salt and pepper. Due to its cooling impact this can be exceptionally well known amid summer months in most portion of the nation. In the event that it is taken without salt, it isn't effortlessly processed. Essentially, drinking of water quickly after eating natural products cause indigestion. Plants are monoecious in nature. Corolla is pompous, yellow in colour, Petals are 5 in number, joined together stamens are joined to calyx tubes. The ovary is inferior. Long melon contains moisture 94.8 g, protein 0.6 g, carbohydrate 3.69g, fat 0.02 g, fiber 1.2g, vitality 15 k-cal, minerals 0.3 g, press 0.25 mg, thiamine 0.029 mg, niacin 0.39 mg, vitamin-C 8.5 mg, calcium 24 mg, phosphorus 13 mg per 100 g of consumable parcel (Ertan et al., 2008, Iranbakhsh and Ebadi, 2008, Krishnamoorthy and Sandooja 1981, Mishra et al., 1972). Its natural products have 94% consumable parcel. It is a yearly monoecious herb. Long melon plants produce stems with shortened internodes and set natural product in near progression. For the most part, the natural products are prepared for picking in around six weeks and picked delicately inside many days after fertilization. These natural products don't store well. Long melon is by and large developed amid spring - summer season (February to April). But amid this trimming season the trim for the most part faces the issue of low temperature within the starting development stage taken after by moisture stress and temperature change issues in afterward organize of edit development. Higher wind speeds coupled with the burning sun powered radiation assist irritates these issues (Pandey and Singh, 1973, Pankaj Gill et al., 2005, Patil et al., 1984, Sadiq, 1990, Songw Chanaki and Omer Munzurigh, 2009).

The sex expression of Long melon is decided by hereditary qualities as well as the environment (e.g. photoperiod, temperature etc.). Since of low temperatures and short photoperiods in early spring, the long melon developed in spring, usually has more female blossoms and less male blooms. But afterward within the season since of high temperatures and long photoperiods, long melon more often than not exhibit more male blooms and less female blooms (Tagmaz Jan 1968). This will cause diminishes of its natural product surrender. Numerous kinds of plant-growth regulator have been utilized in adjustment of sex expression in cucurbits. The business of any one of the chemicals, or controlling temperature and/or light will cause an alter of sex expression in long melon. Be that as it may, controlling temperature and/or light is more troublesome than applying chemicals. Exogenous application with ethylene-releasing compounds such as ethereal or ethephon is among the growth controller, which can be utilized in actuating the femaleness in cucurbit crops, femaleness in cucurbit crops, with a concentration ranged from 100 to 500 mg/l. The objective of my work is

1. To study the effect of plant growth hormones on morpho-physiological parameters of Long melon.
2. To find out the interactive effect of plant growth regulators on the Membrane Injury Index (MI) of leaves of Long melon.
3. To find out the interactive effect of plant growth regulators on the Physiological Trait of Long melon.

## 2. MATERIAL AND METHODS

The experiment being carried out in Agricultural Farm Field (plot no-58) near CTH gate at Lovely Professional University, Phagwara, Punjab during the year 2017-2018 (Fig.1). It requires warm growing season with a temperature of 20°C to 35°C. Cucurbits are mainly grown in subtropical and Tropical regions. It tolerates cool climate better than musk melon. Due to high relative humidity stimulates the development of female flowers. It may show a slight photo reaction. Too short days of flowering; Long melon is cultivated on a wide variety of soils. They grow best in well drained soils. Soils with good organic matter will result in good yield and quality of melon. Appropriate farm yard manure is applied at the time of land preparation. The raised beds are prepared. Number of raised beds made are 7 and the area of each bed is 7m X 1.2m (Fig. 2).



**Figure 1** Layout of Experimental site at the farm (Source: Drawn by Kumar *et al.*, 2018, unpublished)



**Figure 2** Field layout before sowing (Source: Photograph by Virendra *et al.*, 2018, unpublished)

Seeds were collected from PG. Lab of agronomy. The Variety was PB LONGMELON -1. This was suited for *khariif* season. The date of sowing was 3<sup>rd</sup> April, 2018 on plot no. 58. The seed rate was 20g/160m<sup>2</sup> plot (Recommended). Double line planting of seed was done on both sides of beds. The spacing between hills were 60cms and the spacing between the channels was 80cms. First irrigation was given after sowing of seeds. After that, the second irrigation was done at 6days after sowing followed at an interval of 8-10 days. FYM (farm yard manure) with the rate of 6 kg per 160 m<sup>-2</sup> was applied at the time of three leaf stage.

#### Estimation of Membrane Stability Index and Injury Index

The MSI was calculated using the formula described by Premchandra *et al* (1990). Leave were taken from the youngest fully grown leaf. The membrane stability index (MSI) and Membrane Injury Index was estimated by placing 200 mg of leaves in 10 ml double distilled water in two sets. On set was heated at 40°C for 30 min in a water bath and the electrical conductivity (C1) was measured.

The second set was boiled at 100°C in a boiling water bath for 10 min and the conductivity (C2) was measured; both conductivities were measured using a conductivity meter (ME977-C, Max Electronics, India). The MII was calculated using the formula described below

$$MII = 100 \left[ \frac{C1}{C2} \right]$$

### Application of Plant Growth Regulators (PGR)

The plant growth regulators viz. IAA, Salicylic acid and Putrescine were used in the experiment. The proposed concentrations (1 ppm) of these plant growth regulators were applied as foliar spray during experimentation. The first spray was done when the crop was 15 DAS. The morphological and biochemical observation was taken for the growth and development of the plant. The following parameters are observed at 15 and 30 DAS after spraying of the plant growth regulator viz. Plant Height (cm), Leaf Number, Branch number, Node number, Flower number, Internodes number. The plot allotted to us has the area of 160 meter square. The plot was then further divided into 7 rows of equal length and breadth, there are seven numbers of rows and R-2,3 the plant was sprayed with Putrescine @ 1 ppm. In the R4,5 all the plants were sprayed with salicylic acid @ 1 ppm of water and the R6,7 all the plants were IAA @ 1 ppm & R1 was left as control. Polyamines including putrescine are small ubiquitous nitrogenous compounds which are involved in several plant growth and development processes. This is considered the recent additions to the class of plant growth regulators, and as a secondary messenger in signaling pathways (Kusano *et al.*, 2008). Polyamines are involved in abiotic stress tolerance in plants (Nayyar *et al.*, 2005). Increased polyamines level in stressed plants have adaptive significance because of their involvement in regulation of cellular ionic environment, maintenance of membrane integrity, prevention of chlorophyll loss and stimulation of protein, nucleic acid and protective alkaloids (Sharma *et al.*, 1998). Interaction of polyamines with membrane phospholipids implicates membrane stability under stress conditions (Roberts *et al.*, 1986). Polyamines also protect membrane from oxidative damage as they act as free radical scavengers (Besford *et al.*, 2001).

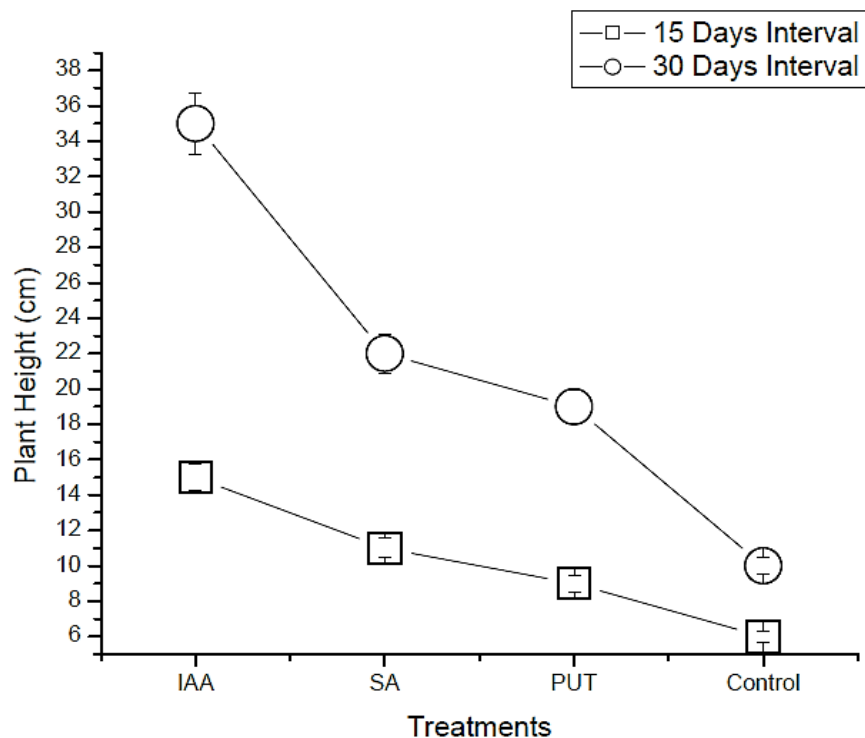


**Figure 3** Application of Plant Growth Regulator (Source: Kumar *et al.*, 2018, unpublished)

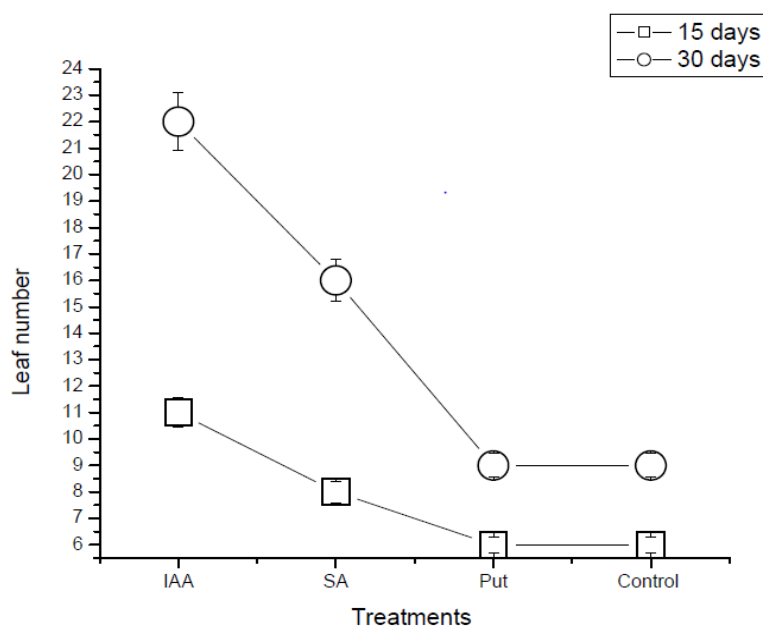
### 3. RESULTS AND DISCUSSION

The plants were randomly selected from the 7 rows and observed after 15 and 30 days of spray. The observation was based on the parameters: height of the plants, number of leaves, number of branches, number of flower, number of nodes and number of internodes. The observation of a number of fruits and weight of fruits could not be done since the fruit initiation has not started yet. The data from all the plants were collected and statistical mean value was taken out for each treatment so that a comparative study could be done. The observations collected are tabulated in the tables given below. The plant height was found higher in IAA treated plants followed by SA and Put with respect to control. This trend was found similar for 15 DAS and 30 DAS (fig.4). The number of leaves was higher in IAA rather than SA and Put with respect to control. The similar trend was observed for 15 DAS and 30 DAS (fig. 5). The similar trend was followed by node number. It is used to identify the percentage of cell membrane damaged in leaves. By conducting this experiment we came to know that in IAA cell membrane injury is less and putrescine it is more. Similar results was

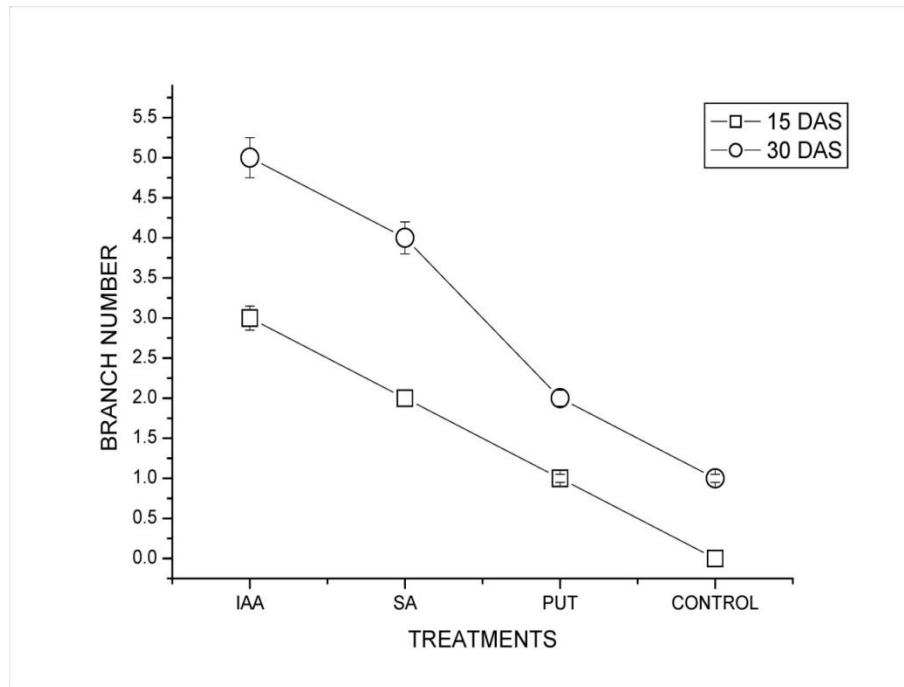
found my several scientist like Abbas et al., 2007, Bose et al., 2000, Bouyoucos 1962, Hidayatullah et al., 2012, Hilli et al., 2008, Hossin et al., 2006, Mibus and Tatliogluu, 2004).



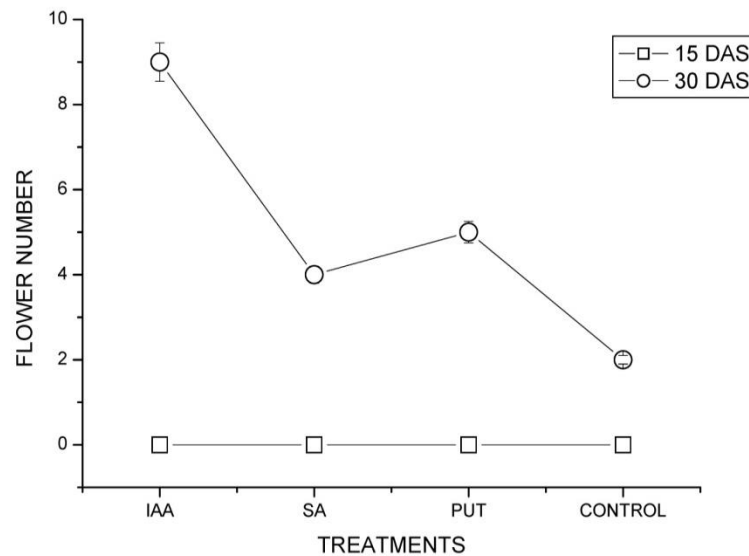
**Figure 4** Observed plant height (cm) at different days interval of PGR application (Source: Drawn by authors *et al.*, 2018, unpublished, LSD: 5%)



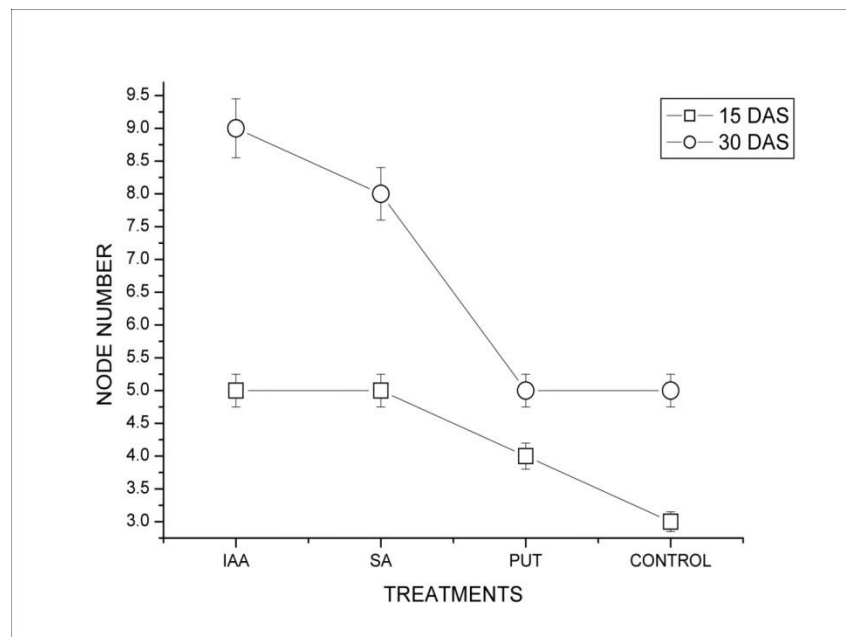
**Figure 5** Observed Leaf number at different days interval of PGR application (Source: Veerendra et al., 2018, unpublished)(LSD at 0.05); (Source: Drawn by authors *et al.*, 2018, unpublished, LSD: 5%)



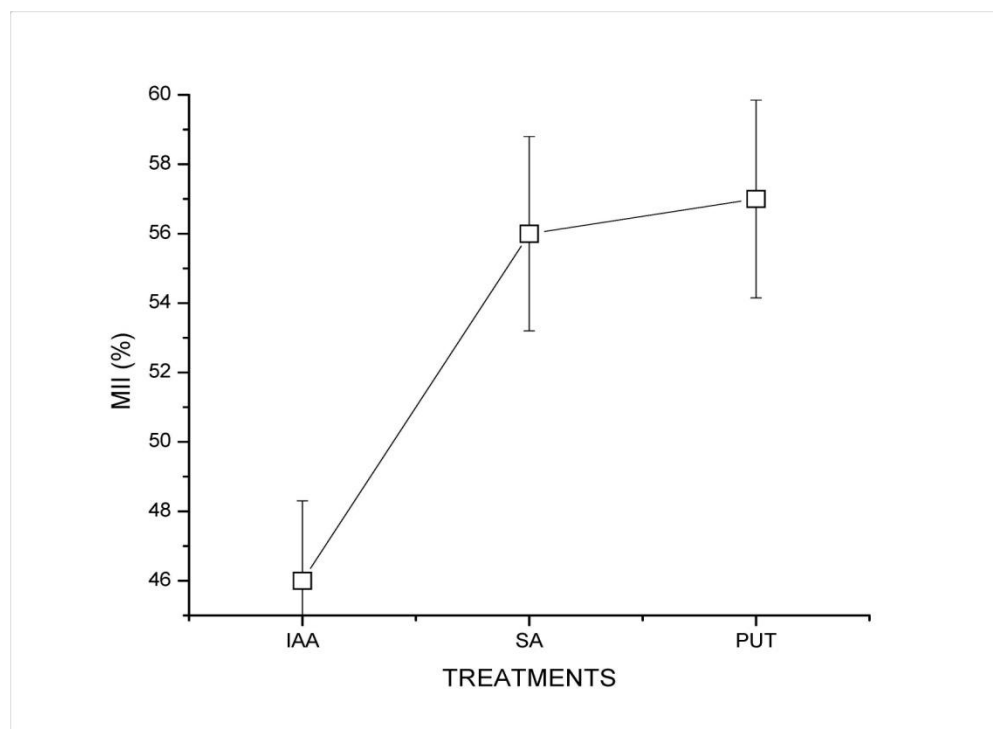
**Figure 6** Branch number at different days interval of PGR application (Source: Drawn by authors *et al.*, 2018, unpublished, LSD: 5%)



**Figure 7** Flowers number at different days interval of PGR application (Source: Drawn by authors *et al.*, 2018, unpublished, LSD: 5%)



**Figure 8** Node number at different days interval of PGR application (Source: Drawn by authors *et al.*, 2018, unpublished, LSD: 5%)



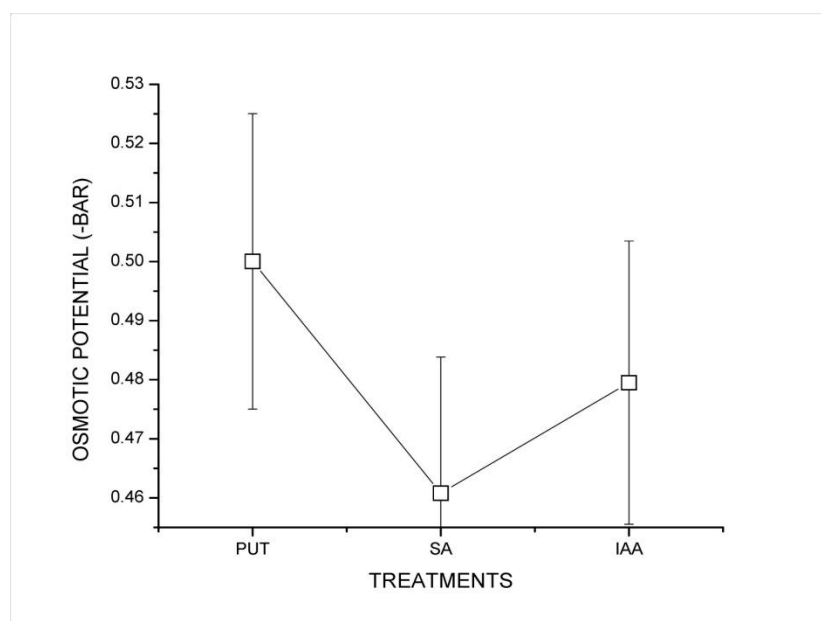
**Figure 9** Membrane Injury Index at different days interval of PGR application (Source: Drawn by authors *et al.*, 2018, unpublished, LSD: 5%)

### Physiological Trait

#### Osmotic Potential (-Bar)

It is used to identify the potential of water molecules to move from hypotonic (more water less solutes) solution to a hypertonic solution (less water more solutes). It also indicates the amount of solutes form after photosynthesis by plants. It was recorded that, higher the photosynthesis, higher the assimilates and lower the osmotic potential and vice versa (Fig.10). By this experiment we know that the putrescine observed the more solute from less water. On the basis of data, we can say putrescine contributes more

in photosynthesis rather than other hormones (Monzano et al., 2001, Ntui et al., 2007, Olson et al., 1954, Panse and Sukhatme, 1984, Thapa et al., 2011).



**Figure 10** Osmotic potential at different days interval of PGR application (Source: Drawn by authors *et al.*, 2018, unpublished, LSD: 5%)

#### 4. CONCLUSION

The result of this investigation clearly shows that the use of plant growth regulator 1 ppm IAA helped in rapid growth and development of the long melon crop. Salicylic acid sprayed at after 30 days of sowing showed successful result in the growth promotion of the long melon crop. After the spraying of Putrisine showed that plants has been tolerated for different environmental conditions. The result shows that the use of salicylic acid increased the number of flower formation, whereas it had no effect in the overall growth and development of the crop. The observation was done in 7rows divided a R1 in which in control R2,3 were putrisine was sprayed R 4-5 were only sprayed with salicylic acid, R6-7 were only sprayed with IAA. After carefully observing the plants from the seven rows we could find out that the plant sprayed with 1 ppm IAA showed rapid growth in height and the number of leaves and the number of branches was also high in number in plants of this row. Since fruiting has not started. The number of buds formation was not affected by the spray of IAA since no drastic increase or decrease in bud formation was observed. Thus, through our findings we can conclude that the use of 1 ppm IAA PGR spray at 30 days after sowing increases the rate of growth and development of the plant by rapidly increasing the height of the plant, number of leaves, number of branches, whereas the spray of salicylic acid during 30 days of sowing rapidly increases the flower bud formation in the increasing number of flowers. Thus plant growth regulators viz. IAA, salicylic acid, putriscine @1 ppm can be recommended for long melon crop.

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**Funding:** This study has not received any external funding.

**Conflict of Interest:** The authors declare that there are no conflicts of interests.

**Peer-review:** External peer-review was done through double-blind method.

#### Data and materials availability:

All data associated with this study are present in the paper.

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